

ORIGINAL ARTICLE

A new species and a new record subspecies of *Ceropales* Latreille, with a key to the genus from China (Hymenoptera: Pompilidae)

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Abstract A new species and a new record subspecies of the genus *Ceropales*, *C. (Priesnerius) pseudobogdanovi* Lu & Li, **sp. nov.** and *C. (Bifodoceropales) pygmaea lehri* Lelej, are reported in this paper. A key to the subgenus and species of the genus *Ceropales* from China is provided.

Key words Hymenoptera, Ceropalinae, *Bifodoceropales*, *Priesnerius*, new species, key.

1 Introduction

Three subgenera, *Ceropales* (*Ceropales*) Latreille, 1796, *C. (Priesnerius)* Moczar, 1978 and *C. (Bifodoceropales)* Priesner, 1969 are reported under the genus *Ceropales* Latreille (Hymenoptera: Pompilidae: Ceropalinae). Then, a key to the species of *Ceropales* (*Priesnerius*) was provided by Moczar (1978). A revision of *Ceropales* (*Priesnerius*) from the Palearctic and Ethiopian Regions was provided by Moczar (1988), nine taxa are revised and 11 species were described as new in that study.

The subgenus *Ceropales* (*Bifodoceropales*) was studied mainly in the Ethiopian and Neotropical Regions by Wahis (1984, 1988). In the past several decades, no species were known from China until two taxa were described as new by Tsuneki (1989) from Taiwan. Moczar (1990) revised the species of *Ceropales* (*Bifodoceropales*) from the Palearctic and Neotropical Regions was provided and seven taxa were described as new. In recent years, the relationships among three subgenera and the key to them were discussed by Moczar (1994).

So far, the subgenus *Ceropales* (*Priesnerius*) includes 19 species and 2 subspecies worldwide, of which 10 species and 1 subspecies occur in the Palearctic Region, 9 species and 1 subspecies in the Ethiopian Region (Moczar, 1977, 1978, 1988; Priesner, 1966). Among them, only 3 species, *C. bogdanovi* (Radoszkowski), *C. polychloros* Gussakovskij, and *C. tobiassi* Moczar, are known from China (Gansu, Inner Mongolia, Shanxi, Xinjiang) (Moczar, 1977, 1978).

The subgenus *Ceropales* (*Bifodoceropales*) includes 30 species and 16 subspecies worldwide, described from the Nearctic, Palearctic, Oriental, Neotropical and Ethiopian Regions (Cameron, 1891; Moczar, 1986; Townes, 1957; Wahis, 1984, 1988). Among them, only 2 species and 1 subspecies, *C. pygmaea pygmaea* Kohl, *C. pygmaea takasago* Tsuneki and *C. taiwannia* Tsuneki, are known from China, distributed in Heilongjiang (Harbin) and Taiwan (Moczar, 1978, 1990; Tsuneki, 1989).

In this paper, a new species and a new record subspecies of the genus *Ceropales* are reported, from the subgenus *C. (Priesnerius)* and *C. (Bifodoceropales)*, respectively. A key to the subgenus and species of the genus *Ceropales* from China is provided.

2 Materials and methods

The specimens are deposited in the Insect Collections of Yunnan Agricultural University, Kunming, Yunnan Province, P. R. China (YNAU) and the Institute of Zoology Chinese Academy of Sciences, Beijing, P. R. China (IZCAS). Olympus stereomicroscope (SZ Series, Japan) with an ocular micrometer was used for the study. Photographs of the habitus were made with Keyence (VHX–H4M).

The abbreviations are as follows:

A1, A2...—antennal article 1, 2...;

HL—head length;

HW—head width;

OOD—ocellocular distance;

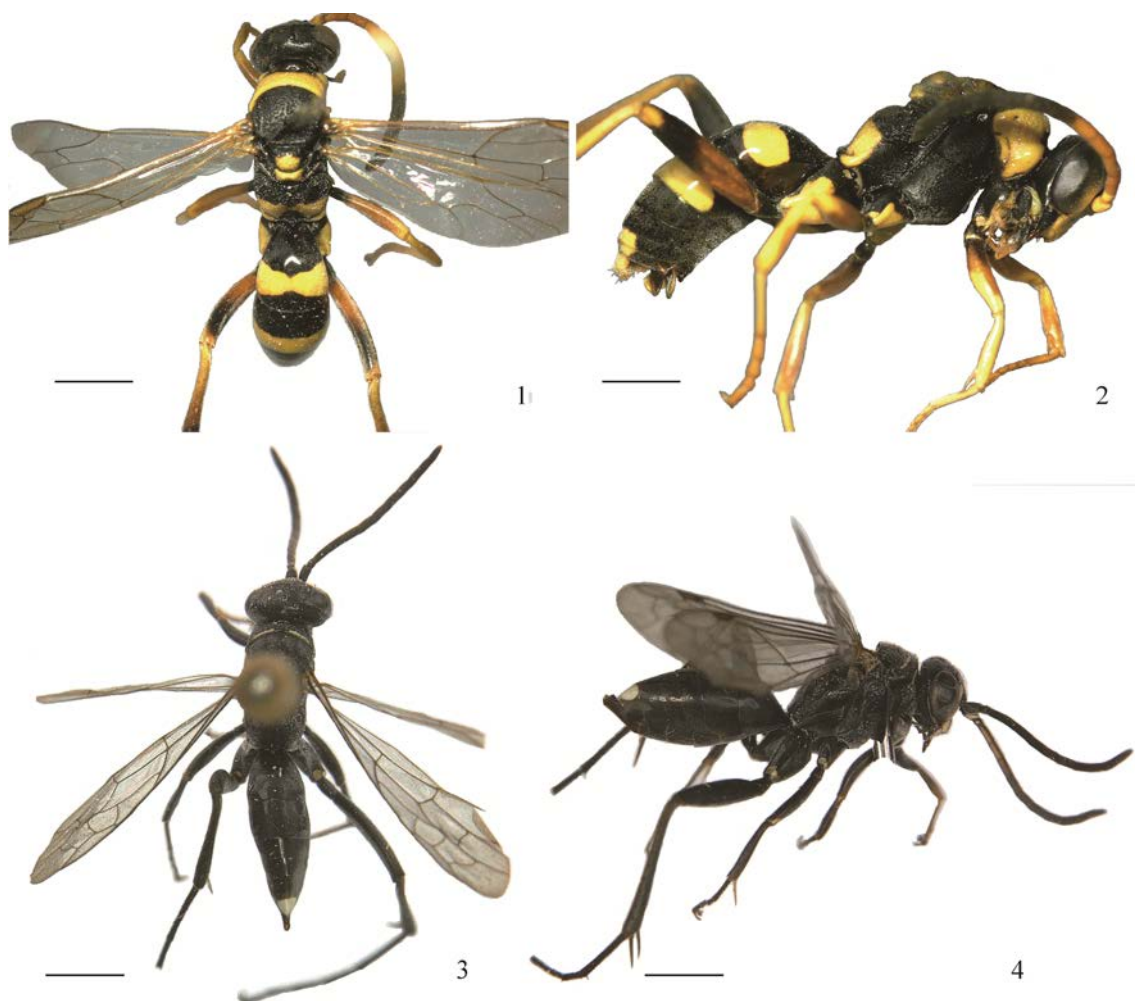
POD—postocellar distance;

T1, T2...—gastral tergum 1, 2....

3 Taxonomy

3.1 *Ceropales* (*Priesnerius*) Moczar, 1978

Priesnerius Moczar, 1978: 349, 351–362; 1979: 343–344.



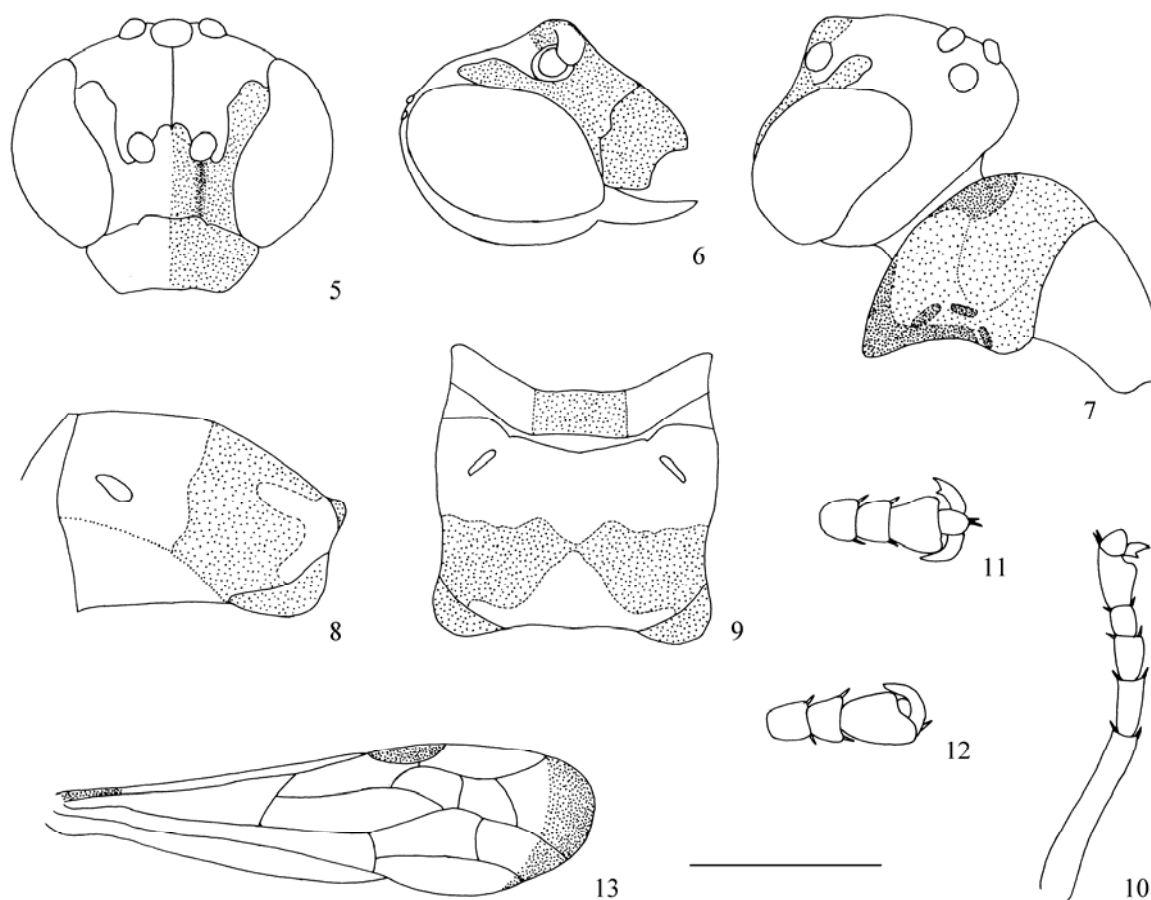
Figures 1–4. *Ceropales* spp., ♂, habitus, dorsal and lateral views. 1–2. *C. (Priesnerius) pseudobogdanovi* Lu & Li, **sp. nov.** 3–4. *C. (Bifodoceropales) pygmaea lehri* Lelej, 1985. Scale bars: 1–2 = 1 mm; 3–4 = 2 mm.

Diagnosis. Hind tarsal claws without or with a tooth, slightly curved or curved at 45° in most species, very few species curved at 90° ; thorax and metasoma usually richly coloured with white or yellow, rarely with ferruginous spots and bands; frons remarkably raised between antennal sockets, surface with fine and very dense punctures; inner margin of hind tibia above with a longitudinal furrow and bordered with a very fine row of dense hairs (Moczar, 1978, 1988).

3.1.1 *Ceropales (P.) pseudobogdanovi* Lu & Li, **sp. nov.** (Figs 1–2, 5–17)

Diagnosis. The new species is similar to *Ceropales (P.) bogdanovi* (Radoszkowski, 1877) but can be distinguished from the later by the following combination of characters: hind tarsal claws curved at 90° ; pronotum yellow except anterior margin; posterior surface of propodeum yellow except cap-shaped area in middle and posterior margin; propodeal enclosure with reticulate rugae medially. In *C. (P.) bogdanovi*: Hind tarsal claws curved at 45° ; pronotum and propodeum wholly yellow; propodeum with transverse wrinkle.

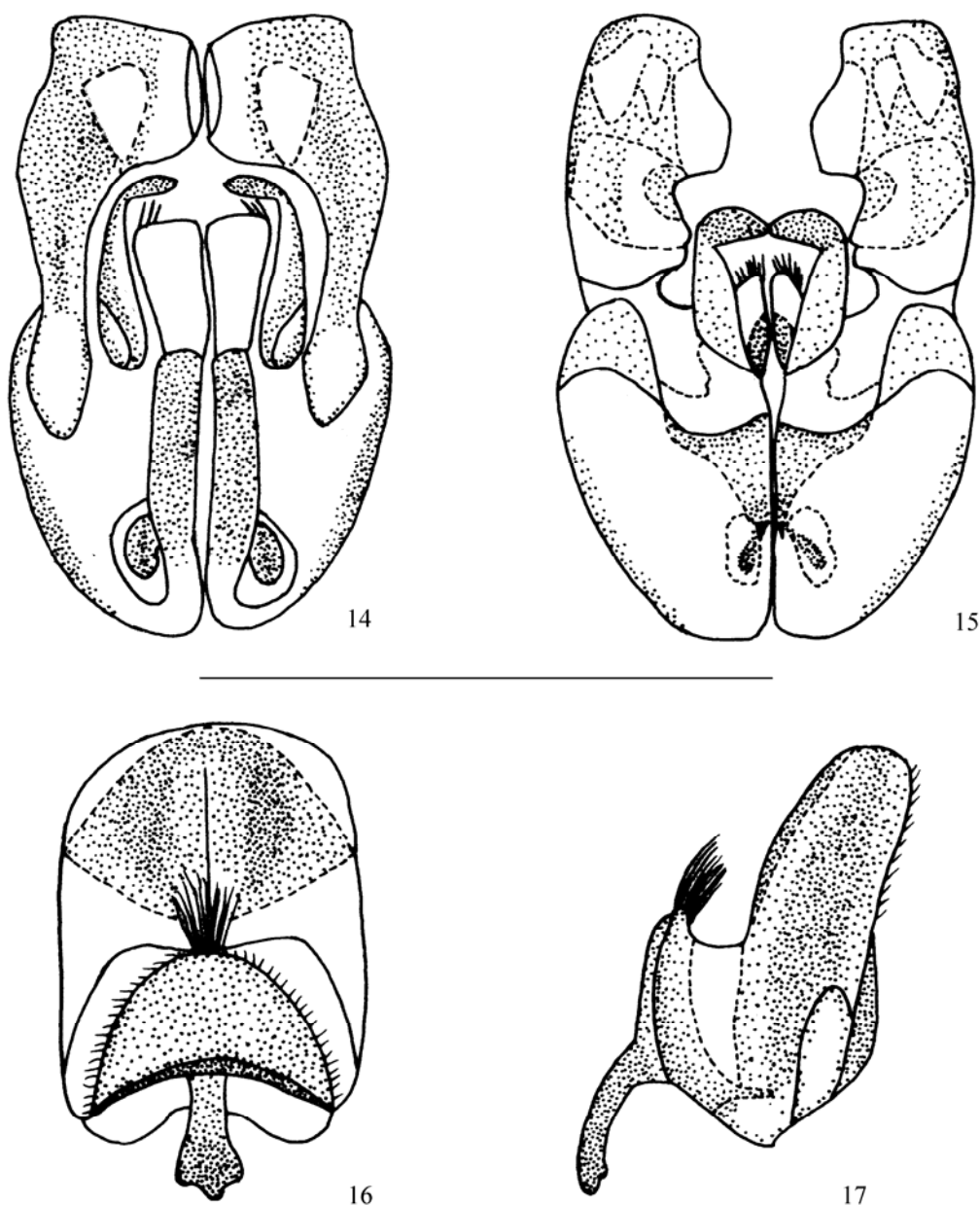
Description. Male. Body length 6.5 mm. Black; yellow present at labrum, clypeus, lower frons, streaks from both sides of frons to depression of compound eyes, spot between antennal sockets (Fig. 5), antennal articles 1–2, pronotum except base, spots on scutellum and metanotum medially, posterior surface of propodeum except cap-shaped area in middle and posterior margin, T1 subapically, broad band on T2 apically, T5–7, fore coxa dorsally, mid coxa ventrally, outer surface of hind coxa, apical half of fore femur ventrally, mid femur apically, outer margin of hind femur apically, fore and mid tibiae and tarsi, and hind tibia basally. Antennal articles 3–6 yellowish-brown; antennal articles 7–13 and lower lateral angle of pronotum anteriorly dark brown; fore and mid femora, basal half of hind femur largely and hind tibia medially reddish brown; wings hyaline, pale brown, outer margin of fore wing with brown markings, veins brown. Body shiny, with dense and fine punctuate-wrinkles, metasoma slim, covered with inconspicuous, yellowish setae.



Figures 5–13. *Ceropales (Priesnerius) pseudobogdanovi* Lu & Li, **sp. nov.**, ♂. 5. Head, front view. 6. Head, lateral view. 7. Head and pronotum, lateral view. 8. Propodeal enclosure, lateral view. 9. Metapostnotum and propodeum, dorsal view. 10. Fore tarsus, lateral view. 11. Fore tarsomeres III–V and claw, dorsal view. 12. Fore tarsomeres III–V and inner claw, lateral view. 13. Fore wing. Scale bars: 1–3, 5 = 1 mm; 4 = 1.24 mm; 6–8 = 1.37 mm; 9 = 0.5 mm.

Head with contiguous and fine punctures. Mandible apically bidentate. Labrum exposed. Clypeus slightly elevated, anterior margin nearly straight, slightly emarginated (Fig. 5). Ocelli in obtuse triangle, ocellar area elevated; upper frons, ocellar area and vertex with contiguous and fine punctures $1-2 \times$ diameters apart, mixed with sparse, large punctures. Frons between antennal sockets remarkably elevated, frontal line distinct, extending to anterior ocellus; upper frons bent in obtuse angle on two-third away from antennal sockets (Fig. 6). Ratio of HW:HL=45:23; POD:OOD=20:17; relative length of A1:A2:A3:A4:A5:A6:A12:A13=10:6:12:15:14:14:11:14.

Thorax. Pronotum with dense and huge punctures, posterior margin arcuate; anterior area with tuberculate prominence and sparse, longitudinal rugae laterally; in lateral view of pronotum, anterolateral angle acute, posterolateral angle stilliform shaped (Fig. 7). Mesonotum with dense, large and deep punctures less than one diameter apart, parapsidal line two-thirds as long as mesonotum. Mesopleuron with large and deep punctures, upper area densely, lower area sparsely; posterior area with scattered, longitudinal, short ridges. Anterior margin of scutellum depressed into transverse sulcus, median area remarkably elevated and with dense and large punctures; posterior and lateral areas with longitudinal, dense and slender rugae. Metanotum elevated medially, with longitudinal, shallow emargination posteriorly; lateral area with longitudinal, scattered



Figures 14–17. *Ceropales (Priesnerius) pseudobogdanovi* Lu & Li, **sp. nov.**, ♂. 14. Male genitalia, dorsal view. 15. Male genitalia, ventral view. 16. Sternum IX, dorsal view. 17. Sternum IX, lateral view. Scale bars = 1 mm.

and sturdy rugae. Metapostnotum with irregular, longitudinal and sturdy rugae, median area shiny, extending to propodeum in obtuse angle, edged carina inconspicuous. Propodeum conspicuously curved at median in lateral view (Fig. 8); propodeal enclosure with reticulate rugae medially and irregular, transverse rugae laterally; posterior surface flat, with irregular, transverse rugae, posterolateral angle subrectangular, posterior margin slightly rounded, area above posterolateral angle depressed into transverse furrow; lateral surface with several longitudinal, slender rugae anteriorly, posterior area flat (Fig. 9). Metapleuron with longitudinal, scattered, long and sturdy rugae, metapleural sulcus present.

Legs. Fore tarsomeres II–IV short, tarsomere V long, with a thumb-like lobe inner-apically (Figs 10–12); length of mid tarsomere II about $3 \times$ as long as width; apical two-thirds of hind tarsomere I with irregular spines, inner margin of basal one-third with a row of setae, tarsomere V with spines apically; inner margin of hind tibia and spur with setae; inner tarsal claws of fore legs modified, with a large tooth basally; other tarsal claws of fore and mid legs with erect and small teeth; hind tarsal claws curved at 90° , without tooth.

Wings. Fore wing with three submarginal cells, upper of submarginal cell III shorter than submarginal cell II and lower distinctly longer than submarginal cell II; first recurrent vein received by submarginal cell II at basal two-thirds, second recurrent vein received by submarginal cell III at basal one-third (Fig. 13); A and cu-a of hindwing forming obtuse angle; hind wing with cu-a meeting M+CuA before point of divergence of M and Cu1.

Metasoma not petiolate. Basal one-fifth of gastral tergum 2 with transverse furrow, coriaceous and shiny basally. Male genitalia see Figs 14–17.

Material examined. Holotype. ♂, China, Inner Mongolia, Wushenqi, Batuwang (38°50'N 108°54'E), 28.VII.2006, coll. Ming Luo, deposited in YNAU. Paratype. 1♂, China, Inner Mongolia, Ximeng, Erlanhaote (43°35'N, 112°17'E), 21.VIII.1971, deposited in IZCAS.

Distribution. China (Inner Mongolia).

Etymology. The specific name *pseudobogdanovi* (*pseudo*-, Greek root), refers to the new species similar with *C. bogdanovi* (Radoszkowski, 1877).

3.2 *Ceropales (Bifodoceropales)* Priesner, 1969

Ceropales (Bifodoceropales) Priesner, 1969: 77; Moczar, 1977: 349.

Diagnosis. body largely black, rarely with white spots and bands; frons with very dense and deep punctures; labrum large, wholly exposed; inner margins of compound eyes strongly curves; fore and mid tarsal claws bifid; hind tarsal claws at least curve at 90° (Moczar, 1990, 1994).

3.2.1 *Ceropales (B.) pygmaea lehri* Lelej, 1985 New record from China (Figs 3–4)

Ceropales (B.) pygmaea lehri Lelej, 1985: 73; Moczar, 1990: 79.

Diagnosis. Body nearly entirely black, head in front with two lateral white streaks from labrum to depression of compound eyes (♀), or lower face nearly entirely white (♂); T6 (♀), T7 (♂) with a large white spot. Hind and fore femora, pronotum and mandible entirely black (♀♂). Labrum with a longitudinal pale brownish streak medially (♂). Apical A13 beneath infusate (♂). Frons, pronotum, mesonotum and partly propodeum with conspicuously dense, close, thimble-like punctures; pronotum also with a row of irregular larger and shallow (♀) or deep (♂) punctures.

Material examined. 1♀, China, Shanxi, Zhuweigou, Qinshui County (35°49'N 114°20'E), 23.VII.2012, coll. Li Jiang, Jian Zhu.

Distribution. China (Shanxi), Russia (Lelei, 1985).

3.3 Key to subgenus and species of *Ceropales* from China

- Hind tarsal claws slightly curved or curved at 90° , without or with a tooth; propodeum mostly flat posteriorly, only rarely slightly convex basally in lateral view (*Ceropales (Priesnerius)*) 2
Hind tarsal claws strong, at least rectangularly curved; propodeum more or less convex at least basally or conspicuously flat over its entire length in lateral view (*Ceropales (Bifodoceropales)*) 5
- Propodeum conspicuously flat over its entire length *C. (P.) polychloros* Gussakovskij, 1931
Propodeum convex basally at least 3
- Hind tarsal claws rather straight, scarcely curved, with a vertical, minute tooth *C. (P.) tobiassi* Moczar, 1978
Hind tarsal claws curved at 45° or 90° , without a vertical, minute tooth 4

4. Hind tarsal claws curved at 45°; T1 with narrow dark brown streak apically; propodeal enclosure with transverse wrinkle *C. (P.) bogdanovi* (Radoszkowski), 1877
Hind tarsal claws curved at 90°; T1 with wide black marking apically; propodeal enclosure with reticulate rugae medially *C. (P.) pseudobogdanovi* Lu & Li, sp. nov.
5. Thorax and metasoma largely with yellow spots *C. (B.) taiwannia* Tsuneki, 1989
Body nearly entirely black; with few light spots 6
6. Head, pronotum and mesonotum with shallow punctures *C. (B.) pygmaea pygmaea* Kohl, 1880
Head, pronotum and mesonotum with deep punctures 7
7. Pronotum with transversely arranged punctures posteriorly; fore femur and mandible entirely black *C. (B.) pygmaea lehri* Lelej, 1985
Pronotum with irregularly arranged punctures posteriorly; fore femur apically and mandible medially and apically reddish yellow to pale brown *C. (B.) pygmaea takasago* Tsuneki, 1989

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